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We Were Deans Once . . . and Young

Veteran PME Educators Look Back

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The publication of a book chapter titled “Professors in the Colonels’ World” by Daniel J. Hughes, a retired Air War College professor, began a debate regarding the quality and future of professional military education (PME) in the US Air Force.¹ The chapter sparked a lively exchange on journalist Tom Ricks’s widely read *Foreign Policy* blog *The Best Defense*.² Among his most serious charges, Hughes claims that Air Force PME is hamstrung because its major educational institutions, particularly Air War College (AWC), are led by senior leaders with little or no academic background. He further claims that the military faculty members at these schools are at best ill prepared for their educational tasks and at worst openly hostile to academic enterprise. Finally, Hughes argues that academic standards and scholarly rigor are noticeably absent from PME. The culprit? Something one might call the “clash of cultures” that exists between civilian and military faculty. Certainly, serious differences exist between these two groups of people, but are those differences so stark as to make life intolerable? Are they insurmountable? Perhaps, but we think not.

This article represents an attempt to distill some of the observations and lessons we have gleaned through many years teaching

within the Air Force, educating the officer corps.³ Most of our examples come from our time at Air Command and Staff College (ACSC) at Maxwell AFB, Alabama, a school that sits a few hundred yards from AWC. Although every school has its own unique culture, most of the points Hughes raises apply to both ACSC and AWC—indeed, to any military college. We state up front that Hughes is onto something, but his conclusions are a bit overdone. This is an attempt to address some of his concerns.⁴ It is not an attempt to refute Hughes’s charges point by point but simply to offer a different perspective. We suspect that these observations might resonate with colleagues at other PME schools, anyone interested in Air Force education, and even those in civilian academe.

Most of us who decide to make a career in Air Force education realize that we are not producing academic specialists. Historians in a civilian history department strive to educate and train graduate students to become professional historians and members of the academic guild. A historian who accepts a job at a PME school will teach students who are already credentialed members of a different guild—the profession of arms. These students may not realize it, but they can benefit from exposure to a his-

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torical or theoretical perspective that can give them insight into their profession and inform their decision making. Both are rewarding undertakings, but they are different. And let's be clear: staff and war colleges are hybrid organizations, following many academic conventions but unmistakably military in orientation. If one accepts these conditioning factors, the challenge of educating air, space, and cyberspace professionals seems less daunting.

Schools Only as Good as Their Faculty

Like the international environment, PME has undergone a series of dramatic changes during the past two decades. It no longer focuses on teaching just the mechanics of officership, narrowly defined in terms of leadership or staff skills, as well as the fundamentals of airpower doctrine and application. The men and women attending today's service colleges are steeped in history and international relations, together with joint, interagency, and multinational operations. Studies on peacekeeping, human rights, and military intervention have shored up obvious security concerns such as terrorism, failed states, and interstate war. Officer education has made strides in becoming more theoretically and practically sound, but as Hughes makes clear, serious issues and challenges face students and faculty, the most important of which is the quality of faculty.

What makes for a great school? It's the amalgam of teachers and students. As Hughes notes, in PME we are fortunate to have students at the top of their year group. They are professionals with years of accomplishments behind them and bright futures ahead. Most will go on to serve as colonels, and some attain flag rank.⁵ Yet their assignments to Maxwell can be a difficult task for them: "Put down your weapons, spool down the jet, and return to school." They have much to learn and sometimes even more to teach, yet we suspect, like Hughes, that

many would prefer to be elsewhere. These warrior-students are exceptional people, but while they are here with us, they are students first and foremost. This distinction is worth emphasizing. Students are here to learn; networking and recharging batteries can be part of the process, but they are not why we have a university. This is important to remember, especially when answering the popular philosophical question "What am I supposed to get out of this?" The answer is, whatever you can. Truth be told, some students will get more from their year here than others. This is the inevitable result of nature or choice, but the central point remains that the integration of knowledge is the students' responsibility. The faculty owes them a sound and coherent curriculum.

Without top-quality faculty, little else matters—technology, infrastructure, and even money pale by comparison. When it comes to educating students, a quality faculty is the alpha and omega—and PME is no different. Along these lines, PME has made some strides. Few people are aware of the fact that in 1990 only two faculty members at ACSC had PhDs. By the 2002–3 academic year, the number of individuals holding advanced degrees (including those who had completed all requirements except the dissertation) had grown to 40, representing 38 percent of the faculty.⁶ How did that happen? It resulted from years of work, keeping one thing in mind: faculty first.

This became evident at a staff meeting one day nearly 15 years ago when we were discussing student assignments with our new commandant. Listening carefully as the dean of students outlined the process for managing student assignments, he then asked, "What are we doing for the faculty?" His point was well taken. "AFPC [Air Force Personnel Center] will take care of student assignments. Starting today—I'm in charge of faculty assignments." During his tenure, faculty assignments were his priority, with a colonel working them personally. He knew that word would spread and that volunteers would emerge. He wasn't wrong.



From 1998 to 2003 or so, ACSC had an uncommonly high promotion rate to lieutenant colonel—for three or four years it hovered around 100 percent in the promotion zone.⁷ What's more, the commandant had devised several attractive assignment options, one of them designed to entice future AWC attendees to spend two years on the faculty at ACSC before attending AWC. The lesson is simple, the implications enormous: to attract a quality faculty, you need to take care of them. Word spread, and quality became a self-fulfilling prophecy. Incidentally, this episode serves as a tonic to Hughes's contention that commandants without formal academic training cannot possess good educational instincts.

In 2000 the desired minimum requirements for faculty duty consisted of resident PME and a master's degree in an appropriate field of study. Though many nonresident graduates enjoyed highly successful faculty tours at ACSC, all things being equal, having experienced a resident program as a student gives a new faculty member a leg up.⁸ Moreover, the school equally sought volunteers. Despite some exceptions, the hiring process tried to hold true to those standards. During the years 2000–2004, we received approximately three or four candidates for every faculty hire we made—nonvolunteer, nonresident graduates were virtually extinct. A good number of the military faculty held PhDs. At the same time, ACSC launched an ambitious faculty hiring process culminating in the appointment of approximately 16 civilian professors.⁹

This is not a story of constant improvement, however. Gains vanished, progress stalled, and wheels underwent reinvention. By 2006 the quality of the faculty had slipped considerably. By comparison, approximately 50 percent of today's faculty are nonresident graduates, and a fair number of them are nonvolunteers. Whereas the school used to count on 30 high-quality faculty hires out of each graduating class, the numbers today are in single digits. Moreover, only 30—less than 25 percent—possess

the PhD.¹⁰ What accounts for this change? Certainly, the wars in Iraq and Afghanistan have played a significant part. However, there are other reasons: a colonel no longer works faculty assignments, the incentive program disappeared for several years before ACSC and AWC reinstated it, maintaining high standards has proven more difficult, and the process has become something other than a self-fulfilling prophecy.¹¹

From our perspective, this is not an impossible situation to remedy. At Air University, teaching in the classroom is akin to flying the jet—everything else supports this mission. Manning the instructor force with nonresident/nonvolunteers without the necessary academic credentials, keeping the best for staff positions, is akin to creaming off the best officers in a flying unit to serve in the command post while the cockpits sit empty. A flying outfit would never tolerate that—and neither should Air Force education.

Core Curriculum Called “Core” for a Reason

The core curriculum of any PME institution generally stems from external and internal guidance. At Air University, external guidance comes from Congress, the Department of Defense, the university, the Joint Staff, major commands, Headquarters Air Force, and the chief of staff himself. Internally, guidance comes primarily from the commandant, the dean, and faculty and student feedback.¹² The point here is that nearly everything happening in the classroom is linked to a requirement. Neither the master's degree nor regional accreditation drives what the schools teach. This is worth mentioning because students, administrators, and even faculty sometimes wrongly associate subject matter with the master's degree—quite simply, if that degree went away, the core curriculum would look much as it does now. It is important to stress, however, that faculty holds this together. The faculty interprets and imple-

ments guidance, has a proprietary interest in the curriculum, and must answer to the various accrediting agencies that visit the university regularly.¹³

Despite popular belief, military organizations exhibit strong biases for change because of the wholesale turnover of commanders and key personnel every few years. Each understandably wants to make his or her mark, but this is a dangerous inclination for curricula. Once in a great while, a massive curriculum revision is warranted (e.g., the ACSC revolution in 1992, led by then-commandant Col John A. Warden III). Educators obviously want to ensure that course materials and readings are up to date and of the highest quality. Yet the basics of a good core interdisciplinary PME curriculum change remarkably little over the years. The core curriculum needs to provide our top officers a structured opportunity for reflection. It should allow them to consider their operational experience in a changing international environment in light of a rigorous examination of history, theory, fact, and analysis—seasoned with a healthy dose of service and joint doctrine/planning. Our schools can do all of that within the confines of the external and internal guidance—perhaps with some finessing, but they can do it.

An educated strategist or commander consists of many things, none more important than a mind that seeks to understand the complexities of humankind—one that recognizes the fragility of civilization and grasps the importance of science and the humanities. Such a mind is conscious of the fact that self-determination and freedom may not be the same thing but nevertheless remain essential elements of social life. This mind is practiced in the art of work well done and strives to build bridges across bodies of knowledge that at first glance appear only loosely related. At the same time, we should also seek, as Clausewitz put it, “to distinguish precisely what at first sight seems fused.”¹⁴

To put those sentiments into play, in 1999 ACSC reorganized into a book-based

semester system, the fall term focusing on broadening and the spring on depth. It had become apparent that courses could be redesigned and the faculty reassigned along functional lines—with PhDs teaching within their specialty and war fighters theirs.¹⁵ How did this turn out? During the years 1999–2003, Air Education and Training Command rated the dean's directorate outstanding, the directorate won the Muir S. Fairchild award twice (in 2003 and 2004), the Southern Association of Colleges and Schools accredited the college's master's degree and gave its faculty-management process a rare “commendable” rating, and the chairman of the Joint Chiefs of Staff's Process for Accreditation of Joint Education reaccredited the degree twice. These accomplishments culminated in a visit by the chief of staff of the Air Force, who, after receiving a two-hour briefing on the curriculum, proclaimed, “You've got it right”—one reason, perhaps, that he gave the college an additional 24 faculty and a considerable sum of money to institute his revolutionary force-development initiative.¹⁶ Review of the data gives the impression that ACSC was moving in the right direction, but in less than a year it began to unravel. What happened?

Part of the explanation lies in a bias toward change exhibited by senior leaders whose managerial instincts, though excellent in their respective fields, did not translate well into education. Outside agencies have injected themselves more and more into curriculum decisions; “too many cooks in the kitchen” is a common lament from educators contemplating an elegant way to insert mandatory “modules” dealing with everything from sexual assault to customs and courtesies. This situation is not uncommon, and in contrast to what Dr. Hughes implies, it is not strictly a military problem. One cannot pick up the *Chronicle of Higher Education* without reading of a distressing trend in academe: activities such as institutional research, outcomes assessment, and data collection—formerly relegated to their proper place on the periphery



of the enterprise—have lately tended to crowd into the center. The Air Force has an institutional bias toward metrics, quantification, and stratification. In our time, we have seen experienced course directors unable to teach because they are too busy “evaluating” instructors; well-constructed and highly rigorous courses abandoned because they have low student-approval ratings; and the “relevance” of faculty research scored on the basis of factors unrelated to scholarly merit. Additionally, we have seen countless stoplight PowerPoint charts that measure nearly everything but the quality of the faculty. We should certainly strive to create meaningful metrics, but one ought to recognize the number of qualified faculty as the most meaningful thing one can count on.

Organizing for Success

During our tenure, ACSC organized into 44 seminars, each with a student seminar leader who tended to students’ needs inside and outside the classroom. A faculty organized into departments did the teaching. Like a squadron commander, the center of gravity of the entire operation—the department chair—was responsible for building a teaching team from whole cloth, a team that planned, trained, flew, and evaluated the mission. In many respects, the chair position is the most senior “honest” job in PME. As is the case at the wing, the further one moves away from the squadron, the harder it becomes to see and assess mission impact.

Currently, no formal mechanism exists for raising up department chairs from the ranks—no ladder to ensure we are grooming the right breed. As for deans, each year or two the school searches far and wide for a colonel who holds the requisite PhD and who may or may not have spent any time in the classroom. After being in business this long, isn’t it time to change that model?

A clear fix begins with teaching—and ensuring teaching excellence, the key to the process, is job one. Regarding our uni-

formed faculty, the advanced academic degree program—by means of which a major or lieutenant colonel goes through a three-year PhD program at a civilian university—remains the surest route to raising our own cadre of PME leaders. These newly minted military PhDs then continue a rigorous progression through the academic ranks. Civilian faculty, already credentialed, must pass a similar series of tests. First, they serve as course director—time spent directing a core course is essential to learning the ropes. From there, they move into an assistant department chair seat, and if they pass that test, they become department chair. A few will go on to become deans and even program managers. Such a process offers another benefit: military and civilian faculty who endure the same rites of passage tend to develop a healthy mutual respect. Ask anyone in the halls of ACSC to name the best seminar teachers—we guarantee they’ll list civilian professors, military academics, and war fighters. Their mix of academic preparation, practical experience, and seminar dynamics marks them as masters of their craft. The idea here is straightforward: we wouldn’t trust our children’s education to amateurs, so why not hold PME to the same standard?

Old Methods Still the Best

Education is notorious for chasing fads. During our tenure, we routinely fought off some colleagues’ impulses to tech-out the classroom, streamline readings, go paperless, and institute “revolutionary” teaching methods. More than a few times, we succumbed to baubles such as “just-in-time faculty development” or “student-driven learning”—and found to our dismay that these labor- and time-saving devices were illusory. We are in complete agreement with Professor Hughes here: high standards must be maintained and defended, however unfashionable they may seem.

Though some of us might balk, Kindle and e-readers may in fact eventually sup-

plant cloth and paper. But make no mistake—in whatever medium they may appear, books have for centuries remained the backbone of advanced education for one very compelling reason: they work. Engaging with an author's argument, weighing the evidence, and connecting the book to other readings and to one's experience—this is the essence of education. The most successful course directors realize that they earn most of their pay by selecting the correct readings. It's no accident that reading well-written books and journal articles makes one a better writer. So we must fight the impulse to assign snippets, summaries, and digests in place of the real thing.

Likewise, classrooms of the future might be our fate but should not be our priority because they will look a lot like the ones from the past. Even the world of distance learning, arguably the most demanding teaching environment, emphasizes replicating the classroom experience, not the other way around. Nevertheless, the desire to create a classroom for the future remains real. Once upon a time, a well-meaning team at ACSC designed such a prototype. It was so cluttered with gadgetry and "smart" accessories that quite some time passed before anyone realized it had no room for the teacher.

In general, the problem with calls for designing "revolutionary methods for learning" and the "classroom of the future" stems from reform movements within public education—"teaching experts" have convinced administrators that critical thinking and levels of learning are more important than content. If there were ever two words we could strike from the English language, they would be *critical thinking*. We watched as the concept moved from obscurity to meaninglessness in the blink of an eye, done in largely by the same "experts" who could not agree on its meaning or importance. *Levels of learning*, another meaningless phrase, has no purpose in education—training, perhaps, but not education.¹⁷ The formula for success in PME is all too familiar: it's content over method, not the other

way around. Many have it backwards, insisting that a jazzier way of learning will produce dramatic effects. In fact, blocking and tackling win games, not trick plays. Those who call for more critical thinking are no more in tune with classroom needs than those who call for more "cowbell" in the making of gold records. Reading, thinking, writing, and speaking—that's what we need more of, and that is hard work.

With respect to hard work, few things require more time and attention than honing the writing skills of our students. After years of reading papers that would shock our old high-school English teachers, we have come to some conclusions. Legions of the Tweet generation struggle to compose a coherent, well-written sentence. Let's forgo talk of the five-paragraph essay, elements of exposition, or even grammar. In fairness, the roots of this problem extend back to grammar school. The fact is that too many students arrive on the steps of PME schools as remarkably poor writers—and for many reasons.¹⁸ The most prevalent one seems to be that they do not read much either. Crippled writers are oftentimes crippled readers, and that impairment takes much time to fix. What's more, they are shocked to discover that their writing skills, in a word, stink. Many of them will claim that they never received a bad grade in their lives. That might be true, but it does nothing to temper the facts: in a typical seminar of 12, a few students write well, a few are truly handicapped, and a bunch in the middle write prose so muddled it is painful to read. Of all the "problems" we have seen in PME, this one is paramount and, surprisingly, misunderstood.

An ACSC commandant once insisted that students write a formal research paper (he seemed to recall writing one himself and thought that if he had to do it, so did they). An important part of intellectual growth, writing research papers instills good habits of mind and patterns of inquiry that stay with students throughout their lives. But to produce one requires considerable time and hands-on attention. Back then, we were still



building up the faculty and felt that we did not have the talent to supervise 600 research papers. That fact did not sway the commandant, who remained adamant, so one day we said to him, "Boss, give us two numbers from one to 44." "Six and 33," he replied. We pulled the latest exams from those two seminars and gave them to him to read. The next day he came by. "Are they all like this?" "Yes, sir, they are." Shocked by the poor quality, he began a writing mentor program immediately. To this day, all of the PME schools struggle to improve students' writing; it remains a work in progress. Suggestions include requiring entrance examinations, assigning writing projects designed to produce publishable work, and rewarding superior writers with favorable performance reports. In our years at Maxwell's School of Advanced Air and Space Studies, we have learned the value of multiple writing opportunities, coupled with extensive feedback.¹⁹

One Faculty, "All In"

Unity of effort, a critical factor in the success of air operations, should apply to education as well. Hughes's critique makes a central point that an unbridgeable gulf had opened up between the military and civilian sides, the leaders and the led. Indeed, a PME faculty is spun from two different yet essential fabrics—the active duty force and civilians. At every opportunity—in dean's calls and department meetings—the phrase "We are ONE faculty!" appeared on a slide or otherwise came into play. To return to our flying-unit analogy, everyone in the building was responsible for generating the sorties—educating students from the stage and in seminar. Not everyone literally appeared in front of the students, but—like the maintainers, munitions folks, life-support personnel, security forces, and so on—everyone knew the mission and played a part in making it happen. Faculty unity is all important. Years before Dr. Hughes's article appeared, some other friends of ours at

AWC developed a presentation highlighting the incompatibilities between civilian academic and military cultures. The presentation had good points, but we prefer to concentrate on those things that unify rather than divide us. At ACSC nearly every important leadership position (with the exceptions of commandant, vice-commandant, and student squadron commander) was filled by civilian and military faculty at various times—and this practice continues to the present. Not to put too fine a point on it, but we do not recognize the world that Hughes describes—a Balkanized faculty consisting of civilian "academics" and military "operators," with "ersatz civilian colonel doctors" hovering in between.

Lately, it does seem that academic administrators have grown apart from the teaching faculty, an inevitable occurrence to some extent as spans of control increase and internal and external demands on administrators grow. Yet we must resist this trend. Veteran teachers must accept the fact that serving as administrators will often be part of their careers; similarly, administrators, including the top military leadership, must get their feet wet in seminars. A few times at ACSC, the commandant mandated that everyone in the building would teach at some point. Impractical, some said. Perhaps. But it sent a very good and powerful message.

Even senior leaders must teach. It can be done. At a few—not many—PME schools, commandants and deans lecture in their specialty and make the time to teach at least one course in seminar. Senior leaders do not need to be "the best sticks" in the seminars, but their presence there gives them tremendous credibility with the students and the faculty. Just as numbered air force and wing commanders of flying units fly, so should PME administrators, no matter their rank, teach. There is nothing like the common experience of the seminar to blur distinctions among faculty members.

Senior leaders must also take time to educate themselves about the business. Operators would rightly bristle if a newcomer

asked, “Why do you guys waste so much time mission planning?” and an AC-130 squadron commander would be baffled by the question “How come you people fly only at night?” Yet people often ask us, in all seriousness, why faculty members could not teach every day of the year or why they need time to get ready for class. Certainly a senior leader has no business telling the students, “I slept in that seat when I was here,” or the perennial “It’s only a lot of reading if you do it.” Such academic malpractice does a disservice to Air University. ACSC leadership has the sometimes delicate task of reminding speakers that “this is not your father’s PME.”

Students: The Only Consumers Who Want to Be Cheated

Lastly, all students seem to prefer teachers who cut corners and hand out high grades like they were candy. How else can one explain the universal joy engendered by the snow day? Nothing pleases youngsters more than not going to school, an attitude that carries forward to college students who insist they must wait no longer than 15 minutes for a full professor to show up for class. No professor, no problem! After many years of reading course critiques, we recognize that student comments such as “Great time management!” often mean “She showed a film, gave us an action-packed 20 minutes, and let us go early!” This is not always the case, but it is mostly true most of the time. However alluring, we must not cave in to the temptation.

This dynamic extends beyond students. Sometimes the senior staff wants to cheat them too. One year at ACSC, during the

time to upgrade the leadership program, we happened to have a creative faculty member who had done something like this elsewhere. After we gave him a team of skilled people and the necessary resources, they went to work to build the most comprehensive leadership program ACSC had ever seen. The day came to brief the boss—the lights went down, and they began unpacking a first-rate program complete with new courses, lectures, and writing assignments. When they had finished, they expectantly awaited the commandant’s verdict. The boss looked over and said, “Now boys, let’s not work the students too hard!” One is tempted to end the anecdote here, but, in fact, the department—military and civilians—went ahead and delivered that first-rate program.²⁰ The commandant supported it, hard work and all.

Concluding Thoughts

One finds the purpose of PME in the letter “E.” On that point, we and Professor Hughes are in complete agreement. Quality faculty, sound curriculum content, and enlightened leadership set the proper tone and get the most out of the civilians, military personnel, and students. No one can deny the importance of education, and the surest way to educate is getting students to read, think, write, and speak—a lot. The faculty represents the key to ensuring the soundness of this process; there are no shortcuts, no magic by which one can bypass hard work and reach an authentic, educated end. And get to the end we must, for the future rests in the hands of those who pass through our doors. Let us never take that for granted. ❖

Maxwell AFB, Alabama



Notes

1. Daniel J. Hughes, "Professors in the Colonels' World," in *Military Culture and Education*, ed. Douglas Higbee (Farnham, United Kingdom: Ashgate Publishing, 2010), 149–66.

2. Thomas E. Ricks, "Need Budget Cuts? We Can Probably Start by Shutting the Air War College," *The Best Defense* (blog), 11 April 2011, http://ricks.foreignpolicy.com/posts/2011/04/11/need_budget_cuts_we_probably_can_start_by_shutting_the_air_war_college.

3. One of us is a retired colonel with a PhD; the other is a civilian professor who has never served in the military. One or both of us were at ACSC from 1991 to 2008. During that time, we both served (at various times) as course director, department chair, vice-dean, and dean of education and curriculum.

4. Readers ought to know that we agonized over this piece for some time, particularly its tone. We do not intend to sound like a couple of old session players blowing their own horns. If that is what you hear, then we missed the mark. Our intention is modest: we saw some good practices along the way, and "here they are."

5. At the School of Advanced Air and Space Studies (SAASS), where we both teach now, approximately 28 percent of our graduates have attained flag rank.

6. One of us was the third civilian PhD hired at ACSC in 1991. See AU-10, *Air University Catalog, Academic Year 2002–2003* (Maxwell AFB, AL: Air University Press, August 2002), 75–80, http://www.au.af.mil/au/cf/au_catalog_2002_03/au_cat_2002-03.pdf. The annual editions of the AU catalog provide valuable information on faculty demographics.

7. Both authors vividly recall the announcements of the results of the promotion lists in the ACSC auditorium. The high promotion rate for ACSC faculty was there for all to see and no doubt helped with recruiting for faculty duty out of the current ACSC class.

8. One should note that Colonel Forsyth did not attend resident intermediate developmental education or senior developmental education.

9. A perusal of the faculty lists published in the *Air University Catalog* from 2000 to 2004 reveals the scope of this effort.

10. AU-10, *Air University Catalog, Academic Year 2010–2011* (Maxwell AFB, AL: Air University Press, October 2010), 264–74, <http://aupress.maxwell.af.mil/digital/pdf/book/AU10.pdf>. Discussions with current ACSC faculty members and administrators confirmed this impression.

11. In reference to the colonel working assignments, not long ago ACSC had a dean of students who, among other things, worked manning issues directly for the commandant.

12. For an example, see "Guidelines for Academic Year 2000 Resident Curriculum Development," ACSC/DE, 29 January 1999, copy in the authors' possession.

13. Air University is aided by the Board of Visitors, Southern Association of Colleges and Schools, and the chairman of the Joint Chiefs of Staff's Process for Accreditation of Joint Education.

14. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984), 141.

15. "ACSC Academic Year 2000 Curriculum Overview," PowerPoint briefing, 12 July 1999, copy in the authors' possession.

16. "ACSC Modular Curriculum VTC," PowerPoint presentation, 18 December 2002, copy in the authors' possession.

17. Our use of the terms *critical thinking* and *levels of learning* is obviously pejorative. If nothing else, liberal education is a process of developing useful habits of mind and patterns of inquiry. Deciphering what those might be is certainly part of learning how to think critically, but we depart from mainstream advocates of "critical thinking" with regard to the means of developing those skills. For instance, in a widely distributed pamphlet titled "How to Study and Learn," the authors make the following claim: "The skills of critical thinking are the keys to learning every subject." Although this observation may have some validity, its importance is truncated by the other 17 ideas listed as essential for becoming a master student. As mentioned above, master students are a product of reading, thinking, writing, and speaking—that amounts to considerable work, something not mentioned in the pamphlet.

18. Some people have argued cogently that the Air Force, as a highly technical and action-oriented service, tends to attract individuals with little interest in written expression.

19. In a typical SAASS year, a student will write at least 10 essays of 10 pages each and a thesis of 60–100 pages, all extensively critiqued by the mentor, adviser, and reader.

20. Commandant PowerPoint presentation, 16 June 1998, copy in the authors' possession.

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Alternative Futures Analysis as a Complement to Planning Processes for the Use of Military Land

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When I took a decision or adopted an alternative, it was after studying every relevant—and many an irrelevant—factor. Geography, tribal structure, religion, social customs, language, appetites, standards—all were at my finger-ends. The enemy I knew almost like my own side.

—T. E. Lawrence (Lawrence of Arabia), 1933

What transpires outside an installation's perimeter influences mission readiness over the long term. That is why Air Force installations invest heavily in collaborative partnering with off-base agencies to develop plans within a regional context.¹ Ensuring the long-term mission effectiveness of military lands requires that commanders and planners at higher echelons anticipate future conditions, including growth of the regional population and development patterns that may contribute to encroachment.² In addition to considering off-base conditions, commanders also recognize that a linear focus in their planning can lead to tunnel vision, leaving the base vulnerable to surprises. How can one counter this potential myopia? This article presents an approach called alternative futures analysis (AFA), which the authors are currently conducting at Nellis AFB, Nevada. The Department of Defense (DOD) has employed this innovative approach at several Army and Marine Corps installations to un-

veil a variety of plausible regional outcomes or “futures” affecting installation projects. Given the successful application in these test locations, the DOD should apply AFA to any future land use study. This article explains alternative futures, including their development and use, and illustrates how the process works by comparing it to military operational planning. Finally, it examines the utility of this approach for installations—how AFA can enhance current installation-planning processes.

Alternative Futures Analysis

A scenario-based planning tool, AFA improves planning at the regional scale. Ensuring mission sustainability requires comprehensive planning. An effective way to stimulate the planning process involves presenting complex issues in the form of a relatively small number of alternative “visions” of how the future may unfold. Com-

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paring the potential consequences of planned actions against alternative future contexts can provide a basis for discussion among planners and give commanders more information as well as a better understanding of the effects of uncertainty upon decision making.³

Scenarios are outlines of events—plausible, fictional plots for the future “constructed for the purpose of focusing attention on causal processes and decision points.”⁴ Leaders commonly and informally use scenarios to evaluate individual and organizational performance against a range of likely variables, or to “chair-fly” a key policy or practice through a complex, imaginary environment. Scenarios in the alternative futures context contain more carefully defined sociological, political, and environmental factors on which planners can build adaptive policies. The scenarios integrate what is occurring and what may come to pass in the region of an installation; they give decision makers a glimpse of futures that differ from the extrapolated present, which is the typical default “trend future.” Blindly relying on a trend future built upon assumptions that might expose the installation to surprises is shortsighted.

Scenarios also offer a context for discussing planning options on base and with regional stakeholders. One can use them as an evaluation tool for predicting shortfalls and inherent inflexibilities before a project begins. The cross-disciplinary planning dialogue integrates typically isolated expertise (“stovepipes”) within a single, structured planning framework. Using AFA, planners can integrate information from each planning discipline to build and execute detailed scenarios with concise, measurable, and plausible outcomes. As a result, decision makers can then consider the implications of plans in more concrete, less abstract terms.⁵

This methodology, currently under development at Nellis AFB by a team of external researchers and the Nellis Public Partnerships Office, has proven useful to military and civilian communities as they

optimize military infrastructure projects against the backdrop of potential future conditions.⁶ The figure on the next page indicates where recent AFAs have been performed.

The AFA process involves describing what the future *could* become (rather than predicting what it *will* become) so that leaders can fashion courses of action (COA) today that address a *range* of potential futures.⁷ Planners enumerate multiple possible scenarios, and the alternative futures provide a means whereby military planners can compare how various factors might influence or encroach upon training operations, facility development, and possible base expansion. Rather than generate probabilities for occurrence, as does statistical forecasting, AFA contrasts one future with another to establish a basis for evaluating relationships among system dynamics, policy choices, and potential consequences. No uniquely optimal set of alternative futures exists; the best set reveals a wide range of possible outcomes that evoke creative, forward-looking plans to cover the broadest range of intersecting futures.

Generating Scenarios and Alternative Futures

Developing alternative futures is a two-step process. Planners develop scenarios for how the future could unfold and then spatially allocate alternative futures based on the trajectory of each scenario.

The premise for an alternative futures study is that landscape change and resultant modifications in elements of the ecosystem and socioeconomic systems, as well as military training and support infrastructure, stem from alterations in regional land use patterns, usually related to changes in urban growth. Therefore, AFAs focus on potential variations in land use and land cover, together with the way these affect the installation. Useful scenarios clarify the most important ambiguities for the future—conditions that commanders may not be able to influence but may need

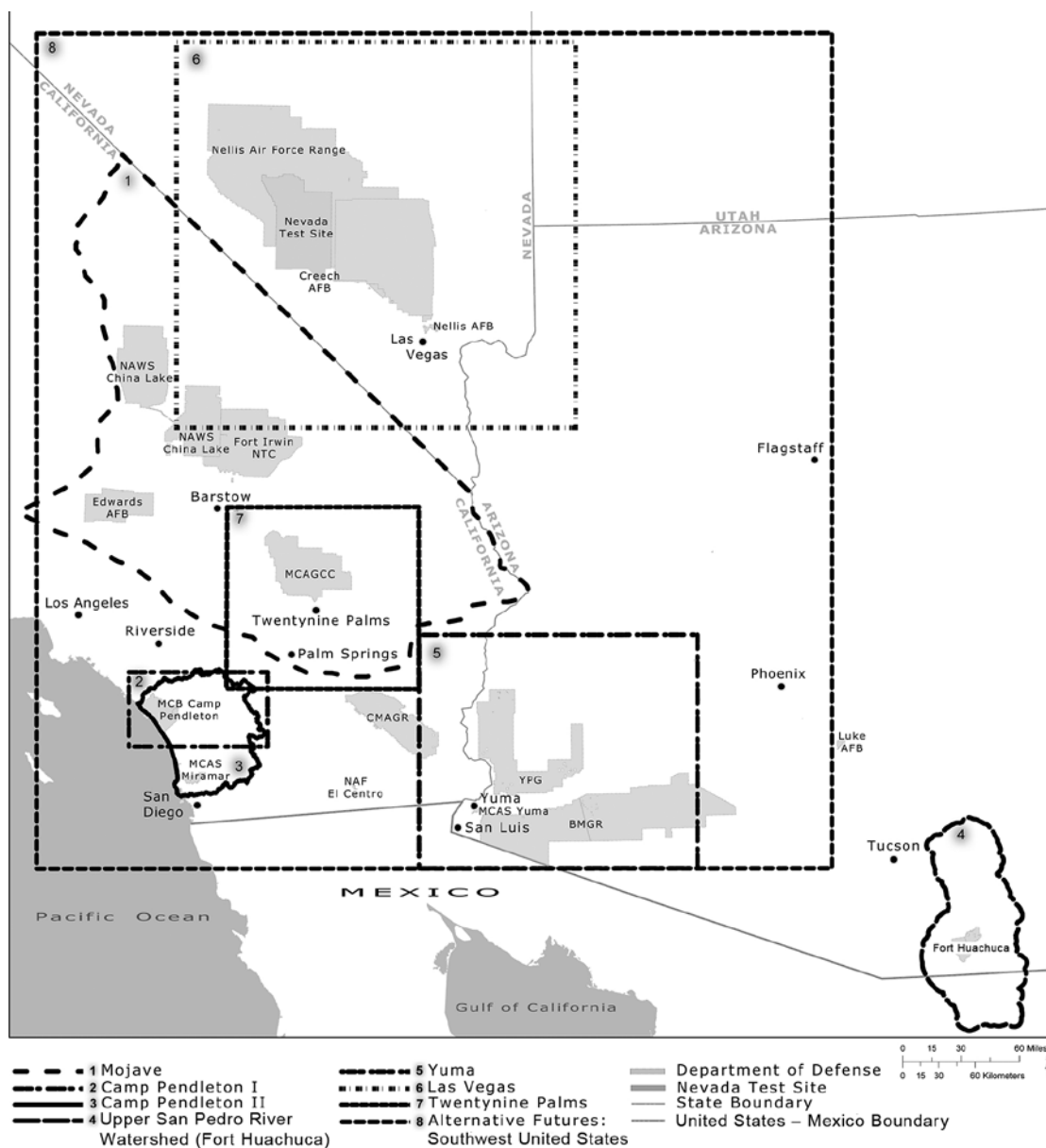


Figure. DOD-oriented alternative futures analyses in the southwestern United States

to cope with. Scenarios can be normative, emphasizing trajectories toward desired goals, or exploratory, examining possible challenges on the horizon.⁸

Understanding the major drivers of transformation in the region enables planners to generate realistic scenarios and explore critical choices that could influence the future. Demographic trends are fundamental drivers of change, as are trends in technology and the economy. Unlike the procedure in trend analysis, planners must also sort through the potential for (and implications of) abrupt shifts in factors ranging from social attitudes to climate change. Critical uncertainties are the most potentially significant of these forces—events that, should they occur, might strongly influence the future of the region; however, planners are fundamentally uncertain about whether or how these events will unfold. One can frame critical uncertainties with questions about, for example, the region's having sufficient water and energy to support military training or about government regulations being more or less restrictive than at present.⁹

Presenting complex issues in the form of several scenarios can lay bare conflicts, inconsistencies, and uncertainties, and reveal how the actions and policies of neighboring land managers might affect an installation's mission over time.¹⁰ Local government actions can influence the patterns of urban growth, including development that might encroach upon military training lands. These government interventions are often reactions to trends (or, conversely, sudden shifts) in the social, economic, and cultural landscape.

The process for scenario development entails working with military planners and regional stakeholders to develop a set of scenarios that incorporate multiple influences upon an installation's infrastructure, support, and military-training operations. The basic framework consists of six steps: (1) specifying focal issues or decisions, (2) identifying driving forces of local and regional change, (3) ranking the factors of change by importance and uncertainty,

(4) using the most potentially significant and uncertain forces to frame the logic of the future, (5) fleshing out the scenarios, and (6) assessing their implications.

Steps one through three develop through workshops, questionnaires, or guided surveys designed to elicit stakeholder opinion. In this process, planners may include managers of installation resources and facilities, military operations personnel, representatives of higher headquarters, representatives of a regional planning agency, and members of advocacy groups.¹¹

Examining a variety of scenarios can reveal strategies for promoting desirable outcomes across a range of possible futures. Having an array of scenarios helps prevent tunnel vision, and leaders can concentrate on critical decision points. Commonly, a group initially develops a rather large set of potential scenarios and then condenses them into a manageable few—typically three to eight which capture the most important uncertainties spanning the range of conditions that the installation and surrounding region might face.

Planners then establish a “future” associated with each scenario. Whereas one may view scenarios as plots or story lines, futures are “snapshots” of specific points along the story line (often 20–30 years into the future).¹² Applying the term *alternative futures* to the set of futures connotes the implicit comparison among them. Divergent scenarios present a range of conceivable trajectories that a system might take, but carrying each scenario to a logical conclusion reveals the consequences of choices and provides a tangible vision of an installation and its neighbors operating within transformed circumstances at a future point in time.¹³ Planners compare the alternative futures to one another relative to the effects upon valued resources. For military studies, such effects often include encroachment upon military facilities and training activities, as well as other factors (see table).

By examining scenarios and their resultant alternative futures, commanders, planners, and regional land use managers can

Table. Factors typically considered in alternative futures analysis

<i>Society</i>	<i>Military</i>	<i>Biophysical</i>
Social Trends	Training-Range Capabilities	Land Cover
Cultural Trends	Base Population	Hydrology
Economic Trends	Flight Routes	Biodiversity
Politics	New Weapons Systems	Air Quality
Demographic Trends	Encroachment	Soils
Urbanization	Regulations	
Aesthetics		
Regulations		

better interpret consequences associated with policies and take action to ensure mission sustainability. The desired outcomes from the AFA process include enhanced understanding of several factors important for planning:

- drivers of change (major trends and forcing factors)
- alternative patterns of land use, mission activities, and resultant effects
- long-term planning needs (for installation and region)
- increased capacity for collaboration and consensus
- mission sustainability

Processes for Military Operational Planning

Although it represents a new method for planning at installations, AFA shares principles with military operational planning. To present AFA in familiar terms, the following discussion compares it to two military operational planning processes—intelligence and war gaming.

Intelligence

AFA is analogous to intelligence preparation of the battlespace (or battlefield) (IPB), the

decision-support process for understanding the battlespace and the options it presents to friendly and enemy forces. IPB is a systematic, continuous process of analyzing enemy capabilities and the environment in a specific geographic area. The products of IPB become part of an intelligence estimate used as a reference by various staff disciplines (such as logistics and operations) to develop staff estimates of the situation and COAs. The IPB process enables the commander to apply and maximize combat power selectively at critical points in time and space.

The first step in IPB, defining the battlefield, focuses the process by identifying aspects of the environment that could influence both friendly and enemy forces. Describing battlespace effects, the second step, entails an in-depth evaluation of the constraints and opportunities offered by the environment. In the third step, intelligence planners concentrate on the capabilities and behavior of the enemy forces, such as size and weapons systems available and the way they organize for battle. Incorporating the results of IPB into COA development ensures that each friendly COA takes advantage of the opportunities offered by the environment and threat situation.¹⁴

Just as IPB emphasizes aspects of the environment and enemy capabilities that most influence the mission, so does AFA address factors that propel the current system (key drivers) as well as those not yet



understood (critical uncertainties).¹⁵ IPB assembles intelligence from a variety of sources to define constraints and opportunities relevant to operational planning; similarly, AFA draws upon diverse information sources to define constraints and opportunities useful in planning for base facilities and range management. Furthermore, IPB informs staff planning during development of an operations plan in much the same way that AFA informs staff planning (as examined in the Nellis AFB case study, below). Although AFA takes more time to employ than does IPB, the processes are similar.

War Gaming

AFA resembles war gaming in several ways. The war game helps the commander identify strengths and weaknesses, associated risks, and asset shortfalls for each COA. During the war game, the staff assembles information from IPB as well as other sources and “fights” the set of enemy COAs (developed during the IPB process) against each friendly COA. The war game proceeds according to an event matrix, not unlike a scenario story line. Matching each friendly COA against each projected enemy COA, the game enables refinement of staff estimates and recommendation of the optimal friendly COA to the commander. War gaming stimulates the staff to consider ideas and insights from new perspectives.¹⁶

The process whereby AFA assembles information is similar to but usually more protracted than that employed in war gaming. Alternative futures analysts use techniques such as questionnaire surveys, planning “studios,” and facilitated workshops based on a Delphi approach—a method developed by the RAND Corporation in the 1960s to make effective use of informed, intuitive judgment. The study team distributes questionnaires to a participant group and compiles the responses, returning the results to participants *without attribution* for additional consideration in light of the group responses. The iterations continue until the group reaches con-

sensus (or until additional convergence of opinion is unlikely).¹⁷

Analysts use the input gathered to identify focal issues and to rank factors of change by importance and level of uncertainty. They identify the critical uncertainties to frame the logic of the scenarios—“What are the most important variables to examine?” In this context, one can view the Delphi approach as an analog for war gaming. Both activities are iterative, facilitated processes for assembling and scoring expert opinion and facts drawn from multiple disciplines.

Much as war gaming examines the relative strengths and weaknesses of COAs, AFA examines key drivers and critical uncertainties to frame scenarios, defining direction and the pace of change. In essence the process presents a geographic vulnerability assessment that can help planners and stakeholders understand the implications of land use choices and tailor the development of COAs to address these futures.

Notional Case Study: Nellis Air Force Base

To demonstrate how one performs an AFA, this article now examines a notional case study—notional because the results of an alternative futures study currently under way at Nellis AFB are not yet available.¹⁸ Details of the research design and the results of that study will appear upon its completion. In the meantime, however, we explain the conduct of the study and anticipate application of the results to installation planning processes.

The research team and representatives from Nellis AFB identified regional stakeholders from a broad range of interests. The team and base personnel met with the stakeholders several times to explain the study process and begin assembling the data necessary for analysis, collecting their input using an e-mail survey instrument that followed the Delphi approach. Stakeholders submitted their views regarding ex-

isting conditions and the future of the region. Concurrently, the research team assembled quantitative and spatial data concerning regional socioeconomic and environmental conditions.

The team generated a set of scenario narratives describing possible changes during the years 2010 to 2040. The scenarios were defined by the key trends and critical uncertainties identified and prioritized by the Nellis AFB team and the stakeholders. Analysts designed the scenarios to explore causal processes and identify key decision points. The figure included earlier in the article depicts the study area—the context area of Nellis AFB; Creech AFB, Nevada; and their training ranges.

Analysts created alternative futures for each scenario, using urban development models to define changes in land use. This process evaluated the attractiveness of available land for development and allocated changes in land use according to model assumptions in keeping with the logic of the various scenarios. The research team then examined these alternative futures for the effects of potential encroachment upon the installations, flight routes, and training ranges, as well as their differential effects on hydrology, biodiversity, and other factors important to installation planners and regional stakeholders. This brief explanation of the study process provides a basis for discussing how the commander and staff of Nellis AFB might use the results.

Encroachment Management

At the establishment of Nellis AFB, many miles separated it from Las Vegas; however, urbanization has crept up to the base perimeter and appears likely to continue to encroach upon the installation, causing problems. The latter include civilian use of airspace interfering with military training, development occurring too close to flight paths, and the construction of infrastructure such as power lines and towers that jeopardize low-level flight.

The Public Partnerships Office at Nellis (in coordination with planners at higher echelons) could use the study to employ strategies for managing “encroachment partnering” and to acquire buffer lands. In these processes, the installation enters into partnerships with agencies or conservation organizations to obtain real estate interests that prevent incompatible uses of the land. Such interests often entail restrictive easements. Another approach, taken by the Joint Land Use Study program, involves installations issuing community-planning assistance grants to help state and local governments better understand and incorporate into their planning the technical aspects of studies on an air installation’s compatible-use zones (air and/or range) and on operational noise management.¹⁹

Importantly, the acquisition of buffer lands preserves significant off-base habitats, potentially alleviating the pressure of environmental encroachment and ameliorating possible regulatory restrictions upon military training. Nellis AFB could use alternative futures to examine how nearby land use might change, thus obtaining insight into prioritizing encroachment partnerships and land acquisitions.

Management Planning for Range Complexes

Installations develop management plans for range complexes in order to sustain the capabilities of military training ranges. One aspect of this planning has to do with identifying and establishing baseline requirements for range maintenance—a baseline used to justify funding and resources necessary to sustain the range and training-area complex.²⁰ Nellis could use AFA to provide context concerning how its ranges and the surrounding lands might change over time. Such information could facilitate prioritization of requirements for range maintenance relative to projected future conditions, potential sources of encroachment pressure, and fiscal constraints.



Comprehensive Planning for Installations

Scenarios and alternative futures can prove useful to facilities and infrastructure planners at the installation and higher echelons. Long-range facilities-development plans represent a long-term investment strategy for developing an installation's physical plant and training lands to support the military mission.²¹ Regulations emphasize the vital relationships among component plans that address sustainable range planning, management planning for real-property assets, environmental planning, and sustainable design and development. Installations coordinate such planning with the local community and must account for regional development and change, identifying strategies for addressing sustainability issues and possible effects on the base's mission.

AFA generates the baseline data and context for any alterations of these same parameters. The assessment of how the region may change over time can inform assumptions about facilities planning and key components of comprehensive planning such as transportation, environment, future development, and encroachment. Knowledge gained through scenario development can assist the Nellis staff in prioritizing specific projects.

Additionally, AFA could enhance comprehensive planning by graphically depicting the multiple ways in which the surrounding community and region might alter over time, presenting new challenges or opportunities to the installation. In this case, planners could check the plan against each future, performing a vulnerability assessment based on the dictum that a plan designed to be robust enough to accommodate multiple potential futures is superior to and more resilient than a plan that considers only the trend future.

Integrated Natural Resource Management Planning

Like all bases with terrain that supports significant natural resources, Nellis AFB implements integrated natural resource manage-

ment planning (INRMP), basically a master plan for natural resources.²² Analysis of plausible futures can assist in goal setting and choosing the means to realize those goals by emphasizing key system drivers and critical uncertainties. Robust strategies would posture the installation adaptively, with the installation formulating exploratory policies and monitoring programs to address unknowns and standing ready to meet a range of future possibilities, as projected within the alternative futures. AFA conveniently fits within the INRMP process. Managers at Nellis could use AFA during the next five-year update to their INRMP.

Programmatic Environmental Consultation

Programmatic agreements for conserving wetlands and habitats offer a means of consulting efficiently with regulatory agencies by bundling a number of resources for regulatory consultation and the issuance of permits. For example, a single umbrella Biological Opinion or Clean Water Act permit could identify and manage all endangered species or wetlands subject to effects produced by military training or infrastructure. However, regulatory agencies might require that the base undertake a comprehensive assessment of the potential impact upon natural resources, as well as the cumulative effects of change over time. Such an assessment would allow the agency to certify that the agreement would not put resources in peril. If Nellis AFB were to engage in this sort of compliance strategy, it could use AFA to supply the regional context for such an assessment.

Higher-Echelon Planning Processes

The perspective gained through AFA may prove particularly relevant to planners and program managers at the major command or service headquarters level—individuals tasked with addressing issues defined by greater temporal and spatial scales than installation commanders must deal with. Although these planners and program

managers play a vital role in planning at the installation level, they are also responsible for planning among installations and training ranges at the regional level. Therefore, regional studies might be especially valuable for integrating plans and programs among bases and across service (and agency) boundaries. In fact, state and federal agency representatives participating in the Western Regional Partnership, led by the Office of the Secretary of Defense, desire this sort of utility from an ongoing alternative futures study that encompasses the Southwest Range Complex—an integrating, large-scale analysis that will anchor the installations within a coherent, albeit dynamic, context.²³ Such a study has the goal of enabling leaders and program managers to envision future support requirements for the training of military forces across a complex of bases, ranges, and operating areas in an altered landscape at some point in the future.

Conclusions

The methods employed in conducting an AFA are similar in process and function to those currently used by military operational planners; for this reason, they complement existing planning processes at installations

especially well. Since AFA can stimulate cross-discipline planning, it is particularly useful in bridging the stovepipes of traditional staff functions and in integrating disparate facilities, operations, and environmental-planning activities.

Commanders and planners can use AFA to examine how to orient an installation's internal planning process to accommodate changes, both gradual and abrupt, within a region and to determine the most valuable strategic relationships as the future unfolds. Moreover, such analysis can integrate plans across spatial and temporal scales, assimilating regional perspectives and addressing long-term prospects of interest to major commands, headquarters, and interservice coordination. AFA enables planners to assemble an array of plausible futures and determine whether plans in use today are robust enough to encompass the implications of each alternative future. Commanders may direct proactive measures to pursue or avoid particular futures.

Granted, a few military installations have used AFA, but the Air Force would benefit by employing it more widely. Future efforts in this area of research should focus on methods for doing so in an efficient and economical manner. ✪

Reno, Nevada

Notes

1. For collaboration requirements and plans, see US Department of Defense, *Resources for INRMP Implementation: A Handbook for the DoD Natural Resources Manager* (Washington, DC: Legacy Resource Management Program, 2005), http://www.denix.osd.mil/nr/upload/INRMP_Handbook_September2005_highres.pdf. See also John S. Thomas, "Ecosystem Management on Military Bases" (PhD diss., George Mason University, 2004), 90–93; Allan W. Shearer et al., *Land Use Scenarios: Environmental Consequences of Development* (Boca Raton, FL: CRC Press, 2009), 37–39; and Department of Defense Directive (DODD) 3200.15, *Sustainment of Ranges and Operating Areas*, 10 January 2003,

<http://www.dtic.mil/whs/directives/corres/pdf/320015p.pdf>.

2. Allan W. Shearer et al., "Examining Development-Related Uncertainties for Environmental Management: Strategic Planning Scenarios in Southern California," *Landscape and Urban Planning* 77, no. 4 (September 2006): 360. See also Shearer et al., *Land Use Scenarios*, 38; and Thomas, "Ecosystem Management," 270–81.

3. For background on scenario studies, see Peter Schwartz, *The Art of the Long View: Planning for the Future in an Uncertain World* (New York: Doubleday, 1991), 29–117. For discussion of support to decision making, see Shearer et al., "Examining Development-Related Uncertainties," 362, 378–79.



4. Schwartz, *Art of the Long View*, 3–6; and Shearer et al., “Examining Development-Related Uncertainties,” 362. The quotation is from Herman Kahn and Anthony J. Wiener, *The Year 2000: A Framework for Speculation on the Next Thirty-Three Years* (New York: Macmillan, 1967), 6.

5. Shearer et al., “Examining Development-Related Uncertainties,” 362.

6. Researchers from the Desert Research Institute (Reno, Nevada), the University of Nevada–Reno, and the University of Texas–Austin are conducting the ongoing project. For the Camp Pendleton and Marine Corps Air Station Miramar study, see Shearer et al., *Land Use Scenarios* as well as Carl Steinitz et al., *Biodiversity and Landscape Planning: Alternative Futures for the Region of Camp Pendleton, California* (Cambridge, MA: Harvard Graduate School of Design, 1996). The Fort Huachuca study is the subject of Carl Steinitz et al., *Alternative Futures for Changing Landscapes: The Upper San Pedro River Basin in Arizona and Sonora* (Washington, DC: Island Press, 2003). Ongoing studies by the authors’ research team involve the Barry M. Goldwater Range, Marine Corps Air Station Yuma, the Marine Corps Air Ground Combat Center, and Yuma Proving Ground.

7. Shearer et al., “Examining Development-Related Uncertainties,” 379–80; and Garry D. Peterson et al., “Assessing Future Ecosystem Services: A Case Study of the Northern Highlands Lake District, Wisconsin,” *Conservation Ecology* 7, no. 3 (January 2003): 1, <http://www.ecologyandsociety.org/vol7/iss3/art1/print.pdf>. For simplified, concise examples of scenarios supporting management programs, see Brian Walker and David Salt, *Resilience Thinking: Sustaining Ecosystems and People in a Changing World* (Washington, DC: Island Press, 2006), 53–63.

8. Shearer et al., “Examining Development-Related Uncertainties,” 363; and Walker and Salt, *Resilience Thinking*, 102.

9. Shearer et al., “Examining Development-Related Uncertainties,” 365.

10. *Ibid.*, 363.

11. *Ibid.*

12. *Ibid.*, 379.

13. *Ibid.*, 363.

14. Field Manual 34-130, *Intelligence Preparation of the Battlefield*, 8 July 1994, chap. 2, <http://www.fas.org/irp/doddir/army/fm34-130.pdf>; and Joint Publication (JP) 2-01.3, *Joint Intelligence Preparation*

of the Operational Environment, 16 June 2009, https://jdeis.js.mil/jdeis/new_pubs/jp2_01_3.pdf.

15. Shearer et al., “Examining Development-Related Uncertainties,” 365.

16. JP 5-0, *Joint Operation Planning*, 26 December 2006, sec. 3, https://jdeis.js.mil/jdeis/new_pubs/jp5_0.pdf.

17. For a discussion of the Delphi approach, see Olaf Helmer, *Analysis of the Future: The Delphi Method*, no. P-3558 (Santa Monica, CA: RAND, March 1967), <http://www.rand.org/content/dam/rand/pubs/papers/2008/P3558.pdf>. For a description of various methods for eliciting stakeholder input and developing scenarios, see Shearer et al., *Land Use Scenarios*, 69–77.

18. Researchers at the Desert Research Institute, the University of Nevada–Reno, and the University of Texas–Austin are conducting the Alternative Futures of the Southwest Range Complex study, funded by the Office of the Secretary of Defense and managed by the US Army Corps of Engineers Combat Engineering Research Laboratory.

19. Regarding easements and land use, see the Trust for Public Land, *Department of Defense Encroachment Partnering*, accessed 20 November 2010, <http://www.tpl.org/what-we-do/policy-legislation/federal-funding-programs/departement-of-defense.html>.

20. See DODD 3200.15, *Sustainment of Ranges*.

21. See USAF Directorate of Engineering and Services, *Long Range Facilities Development Planning Bulletin*, August 1989, <http://www.afcee.af.mil/shared/media/document/AFD-070924-059.pdf>. See also par. 2.6 of Air Force Policy Directive (AFPD) 32-10, *Installations and Facilities*, 4 March 2010, <http://www.e-publishing.af.mil/shared/media/epubs/AFPD32-10.pdf>; and AFPD 32-90, *Real Property Asset Management*, 6 August 2007, <http://www.e-publishing.af.mil/shared/media/epubs/AFPD32-90.pdf>.

22. Required by Title 16, *United States Code*, sec. 670, Sikes Act, <http://www.fws.gov/endangered/esa-library/pdf/2004SikesAct%20NMFWA.pdf>, INRMPs are prepared according to Air Force Instruction 32-7064, *Integrated Natural Resources Management*, 17 September 2004, <http://www.e-publishing.af.mil/shared/media/epubs/AFI32-7064.pdf>.

23. The Office of the Secretary of Defense, with other state and federal partners, formed the Western Regional Partnership. See Western Regional Partnership, accessed 16 January 2011, <https://wrpinfo.org/Default.aspx>.